question.—Prof. E. Ray Lankester, the Pleomorphism of the Schizophyta. A reminder of the simple fact that ten years ago Prof. Lankester called attention to the pleomorphism of the Schizophyta in a paper in this *Journal*, which attracted the deep attention of all those botanists who had taken any interest in the subject.

Journal of Anatomy and Physiology, April 1886, vol. xx., part 3, contains :—Dr. J. W. Frazer, on the action of infused beverages on peptic digestion. This paper is a continuation of one in the eighteenth volume of this *Journal*, and is based on the results of the same experiments, the difference being that the amount of peptones dialysed, instead of being estimated as the total organic matter, as was done in that paper, are here estimated by the amount of organic nitrogen.—W. A. Lane, some variations in the human skeleton ; asymmetry of skull, spinal column, &c., bifid ribs.—Dr. R. L. MacDonnell, case of bicipital rib.—Dr. R. W. Shufeldt, osteology of *Conurus carolinensis* (plates 10 and 11). The extermination of this parrot appears imminent. To this memoir there is appended a synopsis of the skeletal characters of this bird which exhibit many points of interest.—On a Navajo skull (plate 12), with a note by Sir Wm. Turner.—J. Bland Sutton, on the origin of certain cysts (plate 13).—Dr. J. Lockhart Gibson, the blood-forming organs and blood-formation : an experimental research (plate 14) (continued). Among the chief conclusions are the following : throughout life, nucleated red cells, derived from white corpuscles and colourless marrow-cells, are the only predecessors of the non-nucleated red blood-corpuscles. The transformation takes place in the bone marrow, spleen, and lymphatic glands ; the red bone marrow in extra-uterine life plays the more important part in the work, the spleen a subordinate one ; the lymphatics, while chiefly producing white, do also produce red corpuscles. Both colourless cells and nucleated red cells multiply by division in the blood-forming organs, and in these latter there are also to be found cells whose function appears to be to break down red blood-corpuscles.—Dr. E. E. Maddox, on the relation between convergence and accommodation of the eyes.—Dr. R. Robertson, a contribution to splenic pathology (plate 15).—Dr. F. Tuckerman, supernumerary leg in a male frog (*Rana palustris*) (plate 16).—Dr. D. Noël-Paton, the nature of the relationship between urea formation and bile secretion. Both these phenomena would seem to depend in large measure on the destruction of blood-corpuscles, and through this they necessarily bear a direct relationship to one another.—Prof. D'Arcy W. Thompson, on the hind limb in *Ichthyosaurus platyodon*, and on the morphology of vertebrate limbs.—Sir Wm. Turner, on the lumbar curve of the spinal column in several races of men (see also abstract of a memoir on this subject by Prof. D. J. Cuningham, NATURE, vol. xxxiii. p. 378).—Anatomical notes.

American Journal of Science, April.—On Lower Silurian fossils from a limestone of the original Taconic of Prof. Emmons, by James D. Dana. These fossils were recently found in the "sparry" or western limestone of the Taconic system, that is, the oldest limestone stratum of the system according to Emmons. They come from Canaan, New York, near the Massachusetts border, and several species have been determined by Prof. Dwight, notwithstanding the metamorphism of the rock. They include remains of Murchisonias, Pleurotomarias, Crinoids, Fenestellæ, a Trilobite, and probably some Brachiopods, showing that this limestone is not pre-Cambrian or Cambrian, but belongs probably to the Trenton or Lower Silurian age of the Eastern or Stockbridge limestone.—Preliminary report of S. W. Ford and W. B. Dwight upon the fossils obtained in 1885 from metamorphic limestones of the Taconic series of Prof. Emmons at Canaan, New York : A. Explanatory statement with reference to the palæontological investigations at Canaan, by W. B. Dwight. The authors are strongly inclined to the opinion that the limestones of Canaan, which have yielded these fossils, are of Trenton age.—On surface transmission of electrical discharges, by H. S. Carhart. A practical bearing of the experiments here described and illustrated is that there is no sufficient scientific basis for making lightning conductors of large surface, and that large sectional area is essential to ample conductivity.—The minerals of Litchfield, Maine, by F. W. Clarke. The paper contains a careful study and analysis of the elæolite, cancrinite, sodalite, hydronephelite (new species), albite, and lepidomelane from the numerous boulders of an elæolite rock scattered over the district between Litchfield and West Gardiner, in Kennebec County, Maine.—On the chemical behaviour of iron in the magnetic field, by Edward L. Nichols. A set of experiments with aqua-regia, nitric acid, hydrochloric acid, and sulphuric acid is here described in illustration of the phenomenon that, when finely-divided iron is placed in a magnetic field of considerable intensity and exposed to the action of an acid, the chemical reaction differs in many respects from that which occurs under ordinary circumstances. The experiments are preliminary to a more complete investigation of the novel series of effects developed by them.—The inculcation of scientific method by example, with an illustration drawn from the Quaternary geology of Utah, by G. K. Gilbert. This paper is a reprint of the Presidential Address read before the American Society of Naturalists at Boston, December 27, 1885. It discusses, not the results nor the subject-matter of the several sciences with which naturalists are concerned, but their methods of investigation and their methods of teaching generally.—Nova Andromedæ, by Asaph Hall. The history of the discovery of the new star in Andromeda by Dr. Hartwig, of Dorpat, last August, its observation and gradual fading away, forms the subject of this paper.—On some new forms of the Dinocerata, by W. B. Scott. What appears to be a missing link between the two sub-orders of Amblypoda (the Coryphodons of the Wahsatch Eocene and the Dinocerata of the Bridger) is here described under the name of Elachoceras. It was discovered by the Princeton Expedition of 1885 in the Bridger beds of Henry's Fork, Wyoming, and represents a genus allied to Uintatherium, without upper incisors, and having six molars of the Uintatherium type and large upper canine tusks, but without nasal protuberances, and having only rudiments of the maxillary and parietal protuberances. The supra-occipital is pierced by two large venous foramina placed one on each side of the median line. In the same locality, but at a somewhat higher level, was found a large Uintatherium skull, undoubtedly representing a new species (*U. alticeps*) of that genus.

The American Naturalist for April 1886 contains :—On the ancestry of Nasua, by Saml. Lockwood.—On the mechanism of soaring (illustrated), by J. Lancaster.—The Stone Age in Vermont (illustrated), by Geo. H. Perkins.—On Grosse's classification and structure of the Mallophaga (illustrated), by Geo. Macloskie.—On traces of a cyclone which passed over Western Indiana more than 300 years ago, by Jno. T. Campbell.—On the mounting of fossils (illustrated), by F. C. Hill.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, April 1.—"On a New Form of Stereoscope." By A. Stroh.

Two optical lanterns are placed side by side, as for dissolving views. Two transparencies, photographed in the same manner as if intended for an ordinary stereoscope, are placed one in each lantern, and projected on a screen in such a position that they overlap each other as nearly as possible. The picture which is intended to be seen by the right eye may be placed in the right-hand lantern, and the other in the left.

Supported by suitable framework, and in front of the two lenses of the lanterns, is a revolving disk, portions of which are cut away, so that during its revolutions it obscures the light of each lantern alternately, or, in other words, so that only one picture at a time is thrown on the screen. A continuous change from one picture to the other is thus obtained.

In the same framework, and in convenient positions for the observers, two pairs of eye-holes are provided, one pair on either side of the apparatus. Behind each pair is also a rotating disk, and these disks are connected by suitable wheel-work or driving-bands with the one previously mentioned, in such a way that the three disks rotate together, and at the same rate. The two last-named disks are also so cut that they will obstruct the view through the right and left eye-holes alternately.

Finally, the connection between the three disks has to be so arranged that the time of obscuring the view through the right eye-holes, or the left eye-holes, shall coincide with the time when the light is shut off from the right or left lens of the lanterns respectively.

It is obvious that by this arrangement an observer can only see the picture projected from the left lantern with the left eye, and the one from the right-hand lantern with the right eye.

The rotation of the disks must be of such a rate that the alternate flashes of the right and left pictures on the corresponding

eyes follow in such rapid succession that the impression made by one flash does not diminish sensibly before the next flash on the same eye is received. The number of flashes for each eye which is required to produce an apparently continuous view, without any flickering effect, is from thirty to forty per second. As the disks are so cut as to produce two flashes for the right eyes and two for the left in one revolution, they must consequently be kept rotating at a rate of from fifteen to twenty revolutions per second.

The rotation of the disks is effected by a driving-wheel and band worked by a crank handle at the back of the apparatus.

The perspective effect obtained by the above arrangement is very perfect, the image of each object standing out in solid relief.

Considering that by this arrangement the two eyes never see at the same time, and that each eye views its picture after the other, it is interesting to find that the persistence of vision so completely bridges over the alternate interruptions to which it is subjected as to produce the effect of a continuous view.

The advantages claimed for this form of stereoscope are: that the pictures can be enlarged to such an extent as to appear equal to or even larger than the original objects from which they were taken; and that the eyes in looking at the pictures are not in any way subjected to strain by lenses, prisms, or reflectors, or by the difficulty which some persons experience in getting the two pictures to superpose. For each eye views its corresponding picture in exactly the same position it would see it in if it were looking at the original, since the two pictures are practically in the same place, which is not the case in any other form of stereoscope.

Although with the apparatus as here described only two persons can see the pictures at the same time, it would not be very difficult to construct it so as to be available for a greater number. The side disks above described only serve to control one pair of eye-holes each, but by making them larger they would serve for two pairs each, thus accommodating four observers. By increasing the number of disks, the number of observers might be increased proportionately.

May 6.—"The Influence of Stress and Strain on the Physical Properties of Matter. Part I. Elasticity (continued). The Effect of Change of Temperature on the Internal Friction and Torsional Elasticity of Metals." By Herbert Tomlinson, B.A. Communicated by Prof. W. Grylls Adams, M.A., F.R.S.

The author has recently had the honour of presenting to the Society a memoir relating to the internal friction of metals when vibrating torsionally at temperatures ranging from 0° C. to 25° C. He now brings forward results which have been obtained in experiments on the effect of change of temperature on the torsional elasticity and internal friction of metals. The apparatus used and the mode of experimenting are fully described in the paper, so that it will be sufficient, perhaps, to state here that the vibration-period and the logarithmic decrement were very carefully determined at four different temperatures between 0° C. and 100° C., and that the formulæ were worked out by the method of least squares. These formulæ were given in tables.

From a consideration of the tables it may be gathered that:—

(*d*) The torsional elasticity of all metals is temporarily decreased by rise of temperature between the limits of 0° C. and 100° C., the amount of decrease per degree rise of temperature increasing with the temperature. To this may be added that the percentage decrease of torsional elasticity produced by a given rise of temperature is for most metals about twenty times the corresponding percentage increase of length.

(*e*) If we start with a sufficiently low temperature the internal friction of all annealed metals is first temporarily decreased by rise of temperature and afterwards increased. The temperature of minimum internal friction is for most annealed metals between 0° C. and 100° C.; for most hard drawn wire, however, the temperature of minimum internal friction is below 0° C.

(*f*) The temporary change, whether of the nature of increase or decrease, wrought by alteration of temperature in the internal friction of metals, is in most cases enormously greater than the corresponding change in the torsional elasticity.

Linnean Society, May 6.—Sir John Lubbock, Bart., President, in the chair.—Prof. H. Marshall Ward was elected a Fellow of the Society.—Mr. D. Morris exhibited a number of living beetles (*Pyrophorus noctilucus*) from the island of Dominica. These had been fed on sugar-cane during the voyage to England. On the meeting-room being darkened, the phosphorescent show of light emitted by the insects was very brilliant.—Dr. Chas. Cogswell drew attention to framed water-colour drawings of *Lettsomia aggregata* and *Fothergilla gardeni*, botanical mementos of the two distinguished physicians Lettsom and Fothergill.—Sir J. Lubbock's paper on forms of seedlings was, by request, adjourned, so as to give opportunity for discussion of Mr. Romanes's communication.—Mr. G. J. Romanes then read his paper on physiological selection: an additional suggestion on the origin of species. A full account of this paper will appear in a future number.—Thereafter the two following papers were read in abstract:—Descriptions of new species of Galerucidæ, by Joseph S. Baly.—On some new species of the genus *Metzgeria*, by Wm. Mitten.

Geological Society, April 21.—Prof. J. W. Judd, F.R.S., President, in the chair.—Henry Fisher, Frederick Edwin Harman, Henry Johnson, Edward Alloway Pankhurst, and Henry Woolcock were elected Fellows of the Society.—The following communications were read:—On a certain fossiliferous pebble-band in the "Olive group" of the eastern Salt Range, Punjab, by A. B. Wynne, F.G.S. The principal object of this paper was to oppose the views recently published by Dr. Waagen as to the age of certain Boulder-beds in the Salt Range of the Punjab. By that author these beds had been considered contemporaneous with each other, and assigned to the epoch of the Coal-measures, in consequence of the discovery by Dr. H. Warth of Carboniferous fossils, especially Australian forms of Conularia, in nodules restricted to a particular layer in the upper part of a Boulder-bed in the eastern Salt Range. Mr. Wynne adduced evidence to show that the fossils in question occur, not in concretions, as supposed by Dr. Waagen, but in pebbles evidently derived from an older series; and consequently there was no proof that the Boulder-bed in question was older than the Cretaceous Olive-beds with which it had hitherto been associated. The principal Boulder-beds in the Salt Range were then briefly noticed; those beneath the Carboniferous Limestone west of the Indus, those near Amb and Sakesir peak, associated with the "purple sandstone," "Obolus-beds," and "speckled sandstone," and those in the eastern portion of the Salt Range, amongst the beds of the "Salt pseudomorph zone" and "Olive group" being successively passed in review, and their relations to overlying and underlying strata explained. It was shown that Boulder-beds and conglomerates containing pebbles and boulders of the same crystalline rocks are not confined to one horizon. In conclusion, the resemblance of the rock, of which the pebbles containing Conulariæ, &c., were formed, to that forming some of the "magnesian sandstone" and "Obolus-beds" was pointed out, and it was suggested that the pebbles in question may have been derived from representatives of those beds formerly existing to the southward.—On the phosphatic beds in the neighbourhood of Mons, by M. F. L. Cornet, For.Corr.G.S. These beds are situate in the province of Hainaut, near the town of Mons (Belgium); the workings have increased of late years, and in 1884 yielded 85,000 tons of phosphate. They occur in the Upper Cretaceous, which is exceptionally well developed in the district, filling a trough in the Carboniferous rocks, and itself denuded for the reception of Tertiary and Quaternary beds. Omitting all Cretaceous groups below the middle of the fifth stage, the following is the sequence of the Cretaceous beds which contain the phosphatic series:—C. Tufaceous chalk of Ciply, with the Poudingue de la Malogne at its base. D. *Brown phosphatic chalk of Ciply*. E. Coarse chalk of Spiennes. F. White chalk of Nouvelles. F is a pure white chalk with some flints, and contains *Belemnitella mucronata, Rhynchonella octoplicata, Terebratula carnea, Ananchytes ovatus*, &c.,—an horizon well known throughout North-Western Europe. Series E and D represent one geological horizon characterised by Ostrææ, Brachiopoda, &c., in great numbers, but also containing *Belemnitella mucronata*, and lying between two distinct planes of erosion. The brown phosphatic chalk (D), which forms the upper division of the series, is about 70 feet thick, and may be described as consisting of three parts; the upper is tolerably pure carbonate of lime, but in its lower portion becomes charged with brown granules mainly consisting of phosphate of lime; these continue to increase towards the central or main phosphatic mass, which is also highly fossiliferous in places. This central portion constitutes the main phosphatic beds, but the amount of phosphoric acid (dry) is not more than 12 per cent. Hence, it is necessary to increase the richness in phosphate of the deposit in order that it may be available for

conversion into a superphosphate. This may be done by mechanical means. But nature has already partially anticipated this process, and the result has been a deposit known as "rich phosphate," containing about 25 per cent. of phosphoric acid. This occurs in wide cracks and holes in the ordinary phosphatic chalk. It usually occurs as a fine sand-like powder, and is evidently the result of the action of carbonated waters upon the phosphatic chalk, whereby the amount of carbonate of lime is reduced. This is especially the case where the phosphatic chalk is not protected by the tufaceous chalk of Ciply, but is only covered by Tertiary or Quaternary beds. The author calculates that each square foot of the phosphatic basin, which he estimates approximately at 5 miles by 3, contains 355 lbs. of tribasic phosphate of lime. Finally, he intimates how the phosphatisation of the chalk may have been brought about.

Physical Society, May 8.—Prof. H. McLeod, F.R.S., Vice-President, in the chair.—Mr. W. A. Price was elected a member of the Society.—The following communications were read:—On a modified form of Wheatstone's rheostat, by Mr. Shelford Bidwell. A wire is coiled upon a non-conducting cylinder as in the ordinary forms of rheostat, one end of the wire being in contact with the brass axle of the cylinder. A screw is cut upon the axle, the pitch being equal to the distance between the consecutive turns of the wire, and this, working in a fixed nut, causes the whole cylinder to travel in the direction of its axis. A fixed spring bears upon the wire at a convenient point, and by the travelling motion of the cylinder this point of contact remains fixed in space, and the effect of turning the cylinder is to introduce more or less resistance between the spring and the brass axle. Binding screws on the base of the instrument are in contact with the nut and the bearing spring. Though this arrangement has several obvious advantages over the usual forms, Mr. Bidwell does not recommend it in cases where it is required to introduce a known resistance, but where it is important to adjust a resistance to a nicety, or to cause a continuous variation, it is of great use.—Prof. Perry, remarking upon the importance of being able to vary a resistance gradually, described an instrument he had used with advantage. A number of plates of gas-carbon are placed between two parallel copper plates, one of which is fixed and the other adjustable by a screw; by applying pressure by means of the screw the resistance between the plates can be varied uniformly and regularly from 2 to 10 ohms, beyond which point the increase is very rapid.—On a theorem relating to curved diffraction-gratings, by Mr. Walter Baily. In a paper read before the Society in January 1883 the author showed that if a plane be taken perpendicular to the lines of a curved diffraction-grating, and a normal to the grating be taken as the initial line, the equation—

$$\frac{\cos^2\theta}{r} = \frac{\cos\theta}{c} + \frac{1}{d}$$

(in which c is the radius of curvature of the grating, and d is an arbitrary constant), gives a curve having the property that if a point of light be placed anywhere upon it the curve is the locus of the foci of all diffracted rays whether reflected or transmitted. In the present investigation d is supposed to be greater than c, which allows of the source of light being at infinity. The points where the curve given by the above equation cuts the normal are called the normal foci. There are two of these, one relating to the reflected and the other to the transmitted light, the grating being supposed to consist of a number of opaque lines in space. It is then shown that if the grating be supposed to turn about the line in it intersecting the initial line, the normal foci will trace out two parabolas whose common focus is the origin, and common latus rectum is equal to the diameter of curvature of the grating, the parabola for reflected light being convex to the source of light, and that for transmitted light concave.—On some thermodynamical relations, part iv., by Prof. W. Ramsay and Dr. Sydney Young. The first part of this communication deals with Profs. Ayrton and Perry's criticisms upon the previous papers by the authors upon this subject. In the second part a brief review is given of the various attempts that have been made to represent the pressure of a saturated vapour as a function of the temperature.

Anthropological Institute, May 11.—Mr. Francis Galton, F.R.S., President, in the chair.—Mr. Galton read some notes on permanent colour-types in mosaic, in which he advocated the adoption of certain specimens of mosaic material as permanent specimens of standard colours for the description of tints of skin. The original paintings by Broca, as well as the lithographs from them, have already changed colour, and some more permanent standard is greatly needed. There can be no question as to the persistence of the colours of mosaic: some specimens in St. Peter's at Rome, that are more than a century old, have the appearance of being brand-new. The material is inexpensive, and as the variety of tints in the Vatican manufactory is very large, the flesh-tints appropriate to European nations alone being about 500 in number, there would be no difficulty in selecting such a series as anthropologists desire.—Prof. Flower exhibited a Nicobarese skull, sent over by Mr. E. H. Man, together with some photographs of the natives.—Prof. Thane read a paper by Prof. A. Macalister on some African skulls and on a New Ireland skull in the Anatomical Museum of the University of Cambridge.—Dr. Garson reported that the correspondence as to an international agreement on the cephalic index had been brought to a satisfactory conclusion, and that the scheme advocated by him in his paper read before the Institute in February last had been accepted by sixty of the leading anthropologists on the Continent.—Dr. Garson read a paper on the skeleton and cephalic index of Japanese.

Entomological Society, May 5.—Prof. J. O. Westwood, M.A., in the chair.—The following were elected Fellows:—The Rev. E. N. Bloomfield, M.A., Mr. F. Fitch, Mr. A. J. Rose, and Mr. W. E. Nicholson.—Mr. J. Jenner-Weir exhibited a large spiny Lepidopterous larva from Western Africa.—Mr. Stevens exhibited *Apion sorbi* and other Coleoptera recently obtained in the Isle of Wight.—Mr. Crowley exhibited four specimens of *Leto venus*, a large moth belonging to the family *Hepialidæ*, from Natal.—Mr. Howard Vaughan exhibited a long series of *Cidaria immanata* from Kent, Surrey, Perthshire, Isle of Man, Isle of Arran, the Orkneys and Shetlands. He also exhibited *C. russata* from various localities in the south of England, and from Perthshire, Argyllshire, and the Islands of Arran, Lewis, and Hoy. Mr. Vaughan further exhibited varieties of *C. suffumata* from Dover and Darlington. Prof. Westwood commented on the interesting nature of the exhibition of *C. immanata*, and stated that he had never before seen such a wonderful collection of varieties of a single species.—The Rev. W. W. Fowler exhibited *Staphylinus latebrico'a* and *Quedius truncicola*, both from the New Forest.—The Secretary exhibited, for M. H. de la Cuisine, of Dijon, coloured drawings, life-size, of a variety of *Urania crœsus* and a variety of *Papilio memnon*.—Mr. G. Elisha exhibited specimens of *Antispila pfeifferella*, together with the cases, and the leaves mined by the larvæ.—Mr. J. W. Slater read a paper "On the Origin of Colours in Insects," in which he showed that the assertions of Mr. Grant Allen, that all brightly-coloured insects were flower-haunting species were incorrect, and that many brilliantly-coloured insects were carnivorous. Mr. McLachlan said that the physiological question in connection with colour had not been paid attention to; he thought that colour in insects was, to a great extent, dependent upon the circulation of fluids in their wings. The discussion was continued by Prof. Westwood, Mr. H. Goss, the Rev. W. W. Fowler, Mr. Jacoby, and Mr. Weir.

Victoria (Philosophical) Institute, May 3.—A paper by M. Maspero, describing his discovery of many Syrian geographical names in the lists of Thothmes III., was read. It was illustrated by a map, specially prepared by the author, as an aid to the inquirer in following his description of the Egyptian account of the events connected with each name. M. Maspero concluded his statements in the following words:—"Such are the observations which a long study of the lists has suggested to me. I have elsewhere given the justification of my transcriptions. I have endeavoured to bring to my identifications the same prudence that I have exercised in my transcriptions. The The names enumerated arrange themselves almost wholly in the districts that surround Megiddo; Qodshu, Damascus, and two or three other towns at most belong to countries comparatively remote. This result, to which the independent study of the lists has led me, arises clearly from the history of the campaign as the inscription at Karnak makes it known to us. In the year 23 (of his reign) Thothmes III. set out from Gaza, cleared Carmel, beat the confederates, including the prince of Qodshu, under the walls of Megiddo, besieged and took the town, then returned to Egypt without pushing farther on towards the north. The fall of Megiddo was decisive, for, as Thothmes III. has himself observed, 'every chief of the whole country [was shut up] in it, so that the capture of Megiddo was as good as the

taking of a thousand towns.' When the war was finished he 'reinstalled the chiefs in their dignity' on condition that they should pay tribute. The stress of the campaign fell thus on the plain of Esdraëlon: the Egyptian troops had long remained there, and had pillaged all the district round, not without pushing on to some distant points. On his return, when Thothmes III. built the pylon of Karnak with the booty of this campaign, he inscribed on the wall the names of the towns that he had sacked and which had unwillingly contributed to the completion of the edifice. The wall was large, and must be entirely covered. They took indiscriminately all the names of Galilee and Southern Syria that they knew, without troubling about the importance of the town itself: one name did as well as another for that matter." Sir C. Wilson, K.C.M.G., Mr. Boscawen, and others took part in the discussion.

EDINBURGH

Royal Society, April 19.—Sir W. Thomson, Hon. Vice-President, in the chair.—Sir W. Thomson exhibited and described a new form of portable spring balance for the measurement of terrestrial gravity. In this instrument a metallic spring is used. The curvature of the spring when unweighted is such that, when one end is firmly clamped and a suitable weight attached to the other end, the spring becomes straight. When so arranged, the equilibrium of the spring and weight can be made as nearly unstable as is wished by simply tilting the instrument. Hence the apparatus can be made as delicate as necessary.—Mr. A. P. Laurie read a paper on the measurements of the E.M.F. of a constant voltaic cell with moving plates. Mr. Laurie determined the E.M.F. of a cadmium-iodine cell by drawing a large current from it, while the plates were kept moving. The value so got agreed with that given on open circuit as determined by the electrometer, thus showing that the fall of the current when the plates were not moving was due to alteration of the composition of the layers of liquid next the plate.—Mr. W. E. Hoyle read a note on the formation of Hectocotylus in Rossia.—Prof. Tait submitted a paper on some definite integrals.—Messrs. H. Rainy and R. D. Clarkson described the alterations in the electric conducting power of alloys at their melting-point.—The Rev. T. P. Kirkman submitted a communication on the reading of the circle, or circles, of a knot.

May 3.—Robert Gray, Vice-President, in the chair.—Dr. R. W. Felkin read notes on the Waganda, a Central African tribe.—J. Murray discussed the drainage-areas of continents, and their relation to oceanic deposits.—Dr. A. B. Griffiths read a paper on the vitality of the spores of parasitic fungi, and the antiseptic properties of ferrous sulphate.—Dr. R. Stockman discussed the action of benzoyl-ecgonin.

PARIS

Academy of Sciences, May 10.—M. Jurien de la Gravière, President, in the chair.—On the formation of oxalic acid in plants (continued): *Amaranthus caudatus, Chenopodium Quinoa, Mesembryanthemum crystallinum,* by MM. Berthelot and André. Tables are given of the varying quantity of oxalic acid in the roots, stems, leaves, and flowers of these plants at different seasons of the year. The results throw great light on the essentially different physiological conditions of life and organisation in these various types of vegetation.—Observations of the comet 1886 *b* (Brooks II.), and of the new planet 258 (Luther), made at the Paris Observatory (equatorial of the West Tower), by M. G. Bigourdan. The new planet 258 was discovered by Dr. R. Luther at Düsseldorf on May 4 at 10 o'clock mean Düsseldorf time, when it occupied the position: 14h. 20m. R.A.; 9° 31′ Decl. When observed in Paris on May 7 it had the appearance of a planet of the twelfth magnitude.—Observations of the Brooks comets (1886) made at the Lyons Observatory, 6-inch Brunner equatorial, by M. Gonnessiat. Brooks I. appears like a diffused nebulosity with diameter of about 2′, and but slight central condensation. On May 4 the head of No. II. was bright, narrow, and elongated in the angle of position 258°; tail visible for a space of about 12′, faint, and at its extremity spreading out towards the south.—Transformation of the horary angles and declinations to azimuths and heights, by M. Vinot. To supplement Warnstorff's tables, giving this transformation for the latitude of the Altona Observatory, the author has prepared others calculated for the latitude of Paris. They are presented to the Academy in the hope that, if preserved, they may enable other observers to dispense with long and tedious calculations.—On the employment of crusher manometers for the measurement of the pressures developed by explosive substances, by MM. Sarrau and Vieille. Two cases are recorded, in which the maximum pressure is accurately determined by the measured value of the crushing force.—Remarks on M. Ledieu's communication regarding marine engines, by M. Aug. Taurines. Attention is drawn to some errors in this communication presented on March 23, 1885, where M. Ledieu describes the dynamometric experiments made on board the corvette *Le Primauguet,* which he mistook for a simple aviso.—Note on certain sounds produced in vibrating metal plates by the discharges of static electricity, by M. E. Semmola. The conditions are described under which these sounds occur, but no theory is offered in explanation of the phenomenon.—Secondary electrolysis, by M. E. Semmola.—The island of Ferdinandea. the blue sun, and red after-glows of 1831, by M. A. Riccò, With a view to the elucidation of the crepuscular lights of 1883–84, the author gives a detailed account of the analogous phenomena which accompanied the appearance of the island of Ferdinandea in the Sicilian waters in the year 1831. It is pointed out that the atmospheric effects attending the eruption of Ferdinandea closely resembled those following that of Krakatão. But the ashes took no part in the production of the blue sun and red after-glows of 1831; consequently, the ashes of Krakatão would also seem to have had nothing to do with the similar light effects of 1883–84.—Note on the extraordinary halos seen at the Observatory of Parc Saint-Maur on March 29, 1884, and, with still more interesting light effects, on May 3, 1886, by M. E. Renou.—On products of decomposition of hypophosphoric acid: secondary hydrate, by M. A. Joly.—On the definite compounds of hydrochloric acid with the chloride of zinc, by M. R. Engel. The experiments here described have confirmed the theoretical view already advanced by the author, regarding the probable existence of one or more hydrochlorates of the chloride of zinc stable at the ordinary temperature.—On the combinations of quinone with the benzenic phenols, by MM. Ph. de Clermond and P. Chautard.—Action of the perchloride of phosphorus on the hydrocarburets, by MM. Alb. Colson and H. Gautier. It is shown that by means of the perchloride of phosphorus it is possible to substitute chlorine for hydrogen in the aromatic carburets. It thus becomes possible to prepare the symmetrical chloruretted compounds in the fatty and aromatic series to the exclusion of the isomerous substances, which always accompany them in all other methods of preparation.—On the rancid element in butter, by M. E. Duclaux.—Note on sozolic acid (orthoxyphenylsulphurous acid), by M. Serrant. This acid, whose formula is $C_6H_4OH_{(1)}SO_2OH_{(2)}$, is described as even a more powerful antiseptic than salicylic and phenic acid. Being perfectly soluble, it may be taken inwardly without any inconvenience, and is rapidly and completely eliminated from the system.—On the position in the crab of the parasite *Sacculina carcini,* by M. A. Giard.

BERLIN

Physiological Society, April 9.—Dr. Goldscheider spoke on the effect of menthol on the nerves of temperature. It was known that menthol (which for headaches has been extensively applied) generated a keen feeling of cold on being spread over the forehead. It was assumed that this feeling of cold resulted from the cooling of the skin consequent on evaporation. On the other hand, it was explained that the feeling of cold in the mouth produced by mouth washes containing mentha was due to an astringent effect of the mentha. The speaker had come to the conclusion that the two explanations referred to in the respective cases were neither of them correct. He made his experiments with a solution of menthol in lanoline, which was rubbed into circumscribed places of the skin. Measured with the thermometer, the places of the skin in question showed after the rubbing an increase of temperature of about 20° C., and yet for all that there was a quite decided feeling of cold. This feeling of cold was also observed when the place where the solution was rubbed in was protected against evaporation by a watch-glass. The feeling in question could proceed therefore only from a direct stimulation of the nerves of cold sensation. If of two places on the forehead exactly corresponding to one another, the one were rubbed with menthol salve and the other not, then bodies which before had produced no impression, as being indifferent, would now be felt as cold by the part of the skin where the rubbing was made, whereas there would be no perceptible impression at the other part. From these and several other experiments the speaker

concluded that the menthol exercised a specific influence on the nerves of cold, which were distributed with especial copiousness on the forehead. Menthol produced an effect on the nerves of warmth and the nerves of feeling of less amount than on the nerves of cold. A sensation of warmth after the rubbing in of menthol was obtained only at spots which were very rich in nerves of warmth. This was most easily obtained on the volar side of the lower part of the arm in the neighbourhood of the elbow joint. As analogous to his menthol experiments, the speaker called to mind how Prof. Herzen had quite recently communicated the observation that moderate pressure on the nerve-trunk produced a different effect on the cold feeling nerve-ends than on the warm feeling nerve-ends.—Prof. Albrecht, from Brussels, developed his views on the morphological significance of the auditory ossicles of the middle ear, of the external ear, and of the Eustachian tube. Respecting the auditory ossicles there had hitherto prevailed two views. There was, first, the German view, represented by Prof. Gegenbaur, according to which the joint between malleus and incus corresponded to the quadrato-mandibular joint of the lower vertebrates, incus answering to the os lenticulare, stapes to the os quadratum, and malleus to the os articulare. The second view was the English one, set up by Prof. Huxley, according to which all four auditory ossicles of the mammalia were homologous with the os quadratum. The speaker considered both views to be incorrect. As to the latter, the four auditory ossicles of the mammalia, seeing they lay between the fenestra tympanica and the fenestra ovalis, must in his opinion be the homologue of the columella of the reptiles, amphibia, and birds, which likewise extended from the fenestra tympanica to the fenestra ovalis. The columella itself was the homologue of the symplectico-hyomandibulare of the fishes. The auditory ossicles had nothing whatever to do with the quadrato-mandibular joint. The os quadratum of the lower vertebrates must, on the contrary, be sought for at an entirely different place, in the lower part, namely, of the pars squamosa of the temporal bone. At this place Prof. Albrecht had in point of fact observed in different cases fissures by which the superior part was separated from the zygomatic part, the proper os quadratum. The middle ear was, in the opinion of the speaker, divided by the columella into two sections, of which the anterior, the precolumellare, was, through the Eustachian tube, brought into connection with the larynx, and, through the anterior part of the tympanum, with the external organ of hearing. This whole section of the ear was, according to the view of Prof. Albrecht, the remains of a special pharyngeal gill-segmentation.—Prof. Flesch, as guest, communicated some results of his investigations into the peripherical nervous cells. The question of the histological diversity of the nerve-cells, which, by the labours of Stieda, had been solved in a negative sense, had again been taken up by Prof. Flesch. In order to a settlement of the question, he had applied himself to the peripherical nerve-cells and to different methods of staining. It was the colouring method with Weigert's hæmatoxylene and treatment with osmic acid which especially yielded beautiful results. The osmic acid had been used on quite fresh preparations, at most five to ten minutes after the death of the animal. The fact at once established itself that the nerve-cells, under precisely the treatment and under perfectly the same conditions of experiment, showed variations which were not artificial products. It was, first, possible to distinguish between stained and colourless cells. The former were mostly small, the latter large. The relation of the large pale cells to the small dark cells was a perfectly constant one, and that even in the case of different animals. In the peripherical ganglia the pale cells constantly amounted to 20 per cent., the dark to 80 per cent. In the spinal marrow, on the other hand, the number of the pale cells invariably amounted to about 40 per cent. On further investigation it came out that little colourless cells also occurred in small number. The occurrence of these differences among the nerve-cells under use of the most varied staining means and in various animals, especially, however, the determinate numerical relation of the various groups of nerve-cells in the peripherical ganglia and in the spinal marrow, were deemed by the speaker to be proofs that there was here a question of physiological variations. This difference might be of manifold significance. In the first place there might here be a question of various stages of development on the part of the nerve-cells—young, adult, and senile forms. In the second place the various forms might be the expression of a different nature on the part of the nerve-cells: one set being, possibly, motory, another sensory, and so on. In the third place and lastly, these various forms might, in a manner similar to what had been observed in the glandular cells, be the expression of different states of activity or of rest on the part of the nerve-cells. By way of arriving at a decision among these different possibilities, Prof. Flesch had had a series of experimental investigations undertaken which had not yet come to a conclusion. The probability, however, was that the experiments in question pointed to functional variations on the part of the nerve-cells which were the subject of investigation.

BOOKS AND PAMPHLETS RECEIVED

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